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EXAMINER
KRASNIC, BERNARD

ART UNIT	PAPER NUMBER
2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/696,140	SAMADANI, RAMIN	
	Examiner	Art Unit	
	Bernard Krasnic	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 13-30* is/are rejected.

7)☒ Claim(s) *12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10-29-2003 & 4-18-2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

Page 1, line 2: "TECHNICAL FIELD" should be -- TECHNICAL FIELD OF THE INVENTION --.

Page 1, line 4: "BACKGROUND" should be -- BACKGROUND OF THE INVENTION --.

Page 2, line 7: "SUMMARY" should be -- SUMMARY OF THE INVENTION --.

Page 2, line 22: "DESCRIPTION OF DRAWING" should be -- BRIEF DESCRIPTION OF THE DRAWING --.

Page 3, line 14: "DETAILED DESCRIPTION" should be -- DETAILED DESCRIPTION OF THE INVENTION --.

Page 8, line 1: "TT' =" should be -- ZZ' = --, must be consistent with entire specifications.

The functionality of Ref. No. 74 in Fig. 5, is not mentioned in the description.

Appropriate correction is required.

Claim Objections

2. Claims 1, 16, 18-21, and 28-30 are objected to because of the following informalities:

Claim 1, lines 2-3: "each forward transform being" should be -- each of the forward transforms being --.

Claim 1, lines 10-11: "each inverse transform being" should be -- each of the inverse transforms being --.

Claim 16, line 5-6: "derived from a respective quantization value" should be -- derived from the respective quantization value --.

Claim 18, line 2: "the inverse transform" should be -- intermediate images -- as described on page 13, lines 8-11.

Claim 19, line 2: "the inverse transform" should be -- the intermediate images -- as described on page 13, lines 13-15.

Claim 20, line 2: "from a combination of inverse transforms" should be -- from a combination of intermediate images -- as described on page 13, lines 18-20.

Claim 21, lines 2-3: "the inverse transform" should be -- the intermediate images -- as described on page 13, line 20-23.

Claim 28, lines 3-4: "each forward transform being" should be -- each of the forward transforms being --.

Claim 29, lines 2-3: "each forward transform being" should be -- each of the forward transforms being --.

Claim 29, lines 11-12: "each inverse transform being" should be -- each of the inverse transforms being --.

Claim 30, lines 3-4: "each forward transform being" should be -- each of the forward transforms being --.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. Claim 30 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

In claim 30, a "machine-readable medium storing machine-readable instructions" is not subject matter limited to that which falls within a statutory category of invention because it is not limited to a process, machine, manufacture, or a composition of matter. Instead, it includes a computer program. A computer program does not fall within a statutory category since it is clearly not a series of steps or acts to constitute a process, not a mechanical device or combination of mechanical devices to constitute a machine, not a tangible physical article or object which is some form of matter to be a product and constitute a manufacture, and not a composition of two or more substances to constitute a composition of matter.

It is suggested to replace the existing "machine-readable medium storing machine-readable instructions for causing a machine to" to -- a computer-readable medium storing a computer program for causing a computer to -- as

described by the interim guidelines on page 53 to define a structural and functional interrelationship between the computer program and the rest of the computer.

Further, this 101 issue should be viewed in accordance with the specification. However, there is no clear explanation for a computer readable medium storing computer program. Accordingly, on page 5, lines 24-32 in the specification, module (66-72) may be interpreted as computer readable medium which includes the details as described in page 5, lines 24-28. The applicant needs to clarify the support for the computer readable medium in the specification.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 3, 5-7, 14, 15, and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re Claim 3: The phrase "on different respective blocking grids" in line 2 renders the claim indefinite because it is not clear which different respective blocking grids are being mentioned; and further, what is it respectively different to. Also, is the phrase "based on blocking grids used" in line 3 renders the claim indefinite because it is not clear if it is

making reference to the mentioned "different respective blocking grids" in line 2 or not.

Re Claims 5-7: These three claims are considered to be indefinite because they are dependent upon claim 3.

Re Claim 14: The limitation "computed based on a factorization of Z" is not a further limitation of claim 1's method of calculating Z, it is simply just another different method of calculating Z. Therefore the claim does not set forth the metes and bounds of the claim scope.

Re Claim 15: The limitation "the given quantization process" in lines 3-4 lacks clear antecedent basis. It is suggested to be -- a given quantization process --.

Re Claim 27: The limitation "the base image" in lines 1-3 and the limitation "the ringing correction image" in line 2 lacks clear antecedent basis. It appears to be dependent upon claim 22 and has been treated as such.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-5, 8, 13, 15-16, 18-21, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nosratinia (Journal of VLSI Signal Processing vol 27, 69-79, 2001, "Enhancement of JPEG-Compressed Images by Re-application of JPEG"), in view of Hallapuro et al (US 7,082,450B2) and further in view of Winger et al (US 2004/0240556A1).

Nosratinia discloses:

> Re Claims 1, and 28-30: Nosratinia for claim 1 discloses a method of processing an input image, comprising computing spatially-shifted forward transforms (Fig. 5 redundant expansion block, pages 71-73, section 3.1) of the input image, each forward transform being computed based on a denoiser transform Z having an associated transpose Z', wherein a matrix multiplication between Z and Z' produces a diagonal matrix Λ, Z = F(D), F specifies a mapping from coefficients of D to coefficients of Z (Note that if the mapping function F was a linear mapping, it is possible that F is just equal to D), and D substantially corresponds to a frequency-domain transform / DCT (Fig. 5, pages 71-73, section 3.1); denoising the forward

transforms based on nonlinear mappings derived from quantization values linked to the input image; computing spatially-shifted inverse transforms (Fig. 5 inverse redundant expansion, pages 73-74, section 3.2) of the denoised forward transforms, each inverse transform being computed based on Z and Z'; and computing an output image (Fig. 5 enhanced image, pages 73-74, section 3.2) based on a combination of spatially-shifted inverse transforms.

This is similarly applied to claim 28 where instead of a method comprising of several steps, a system comprising of several modules to produce those same steps respectively is considered. Nosratinia teaches all the limitations in the same respective manner as described above for claim 1.

This is similarly applied to claim 29 where instead of a method comprising of several steps, a system comprising of several means to produce those same steps respectively is considered. Nosratinia teaches all the limitations in the same respective manner as described above for claim 1.

The limitations as recited in claim 29 in lines 2-14, "means for computing spatially-shifted forward transforms", "means for denoising the forward transforms", "means for computing spatially-shifted inverse transforms", and "means for computing an output image" invoke 35 USC 112, 6th paragraph.

This is similarly applied to claim 30 as understood where instead of a method comprising of several steps, a computer-readable medium storing a computer program for causing a computer to compute those several same steps respectively is considered. Nosratinia teaches all the limitations in the same respective manor as described above for claim 1.

Re Claim 2: Nosratinia discloses D is a block-based linear transform (page 69, section 1, lines 1-3, Fig. 5 redundant expansion block, pages 71-73, section 3.1).

Re Claim 3: Nosratinia discloses the spatially-shifted forward transforms are computed based on different respective blocking grids and the spatially-shifted inverse transforms are computed based on blocking grids used to compute corresponding spatially-shifted forward transforms (Fig. 5 redundant expansion block, pages 71-73, section 3.1). The inverse transforms are just the inverse of the forward transforms as seen in Fig. 5.

Re Claim 4: Nosratinia discloses D is a discrete cosine transform (page 69, section 1, lines 1-3, Fig. 5 redundant expansion block, pages 71-73, section 3.1).

Re Claim 5: Nosratinia discloses D could be a two dimensional discrete cosine transform, but it is also obvious to one of ordinary skill in the art at

the time the invention was made to establish the fact that a one-dimensional discrete cosine transform could also be applied because a 2-D DCT is just a combination of 1-D DCT's (page 69, section 1, lines 1-3, pages 75, paragraph 2).

Re Claim 8: Nosratinia discloses a quantizer Q which to one of ordinary skill in the art at the time the invention was made could be considered as F, where F is a mapping from coefficients of D to corresponding coefficients of Z having values selected from 0 and $\pm 2^N$ where N has an integer value because this type of quantizer is a typical quantizer used in many fields of endeavor.

Re Claim 15: Nosratinia discloses the input image corresponds to a decompressed version of an input image compressed based on a given quantization process and the forward transforms are denoised based on the given quantization process (Fig. 5 Q, pages 71-73, section 3.1). The Q in Fig. 5 shows the quantization process which may denoise the forward transforms.

Re Claim 18: Nosratinia discloses the output image is computed from a weighted combination of the inverse transforms (Fig. 5, pages 71-73, section 3.1). Nosratinia creates an average of the output image results for each shift component to create the enhanced image. When taking this

average, it is assumed that the weighted factor is one, but the weighted factor if common could be anything and the average would be once again the same.

Re Claim 19: Nosratinia discloses the computed output image corresponds to an average of the inverse transforms (Fig. 5, pages 71-73, section 3.1). Nosratinia creates an average of the output image results for each shift component to create the enhanced image.

Re Claim 20: Nosratinia discloses computing the output image comprises computing a base image / enhanced image from a combination of inverse transforms (Fig. 5, pages 71-73, section 3.1).

Re Claim 21: Nosratinia discloses the base image has pixels values corresponding to respective averages of values of corresponding pixels in the inverse transform (Fig. 5, pages 71-73, section 3.1). Taking the average of several images to produce one image is the same as producing one image having pixel values corresponding to respective averages of values of corresponding pixels in those several images.

However, Nosratinia does not disclose or fairly suggest for each of the claims 1, and 28-30 respectively exactly how each of the forward

transforms are being computed based on a denoiser transform Z and how to denoise the forward transforms based on nonlinear mapping.

Hallapuro discloses how each of the forward transforms / desired transform matrix (col. 8, lines 51-53) are being computed based on a denoiser transform Z / A (col. 8, lines 51-53). The applicant describes the forward transform B is ZXZ' and Hallapuro describes the desired transform matrix Y is AXA'. Note that the inverse transform would obviously be computed by inversing the above procedure, which is equivalent to what has been described by the applicant.

Therefore, in view of Hallapuro, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nosratinia's method by including the computation of deriving the forward transforms by a denoiser transform Z in order to require less operations when the transform is applied to digital data.

However, Nosratinia as modified by Hallapuro still does not disclose or fairly suggest how to denoise the forward transforms based on nonlinear mapping.

Winger discloses how to denoise the forward transforms based on nonlinear mapping / threshold (Fig. 5, page 3, col. [0034]) and the forward transforms are denoised by setting to zero each forward transform

coefficient with an absolute value below a respective threshold derived from a respective quantization value linked to the input image and leaving unchanged each forward transform coefficient with an absolute equal to at least a respective threshold derived from a respective quantization value linked to the input image (Fig 5, page 3, col. [0034]) as recited in claim 16.

Therefore, in view of Winger, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Nosratinia's method as modified by Hallapuro, by including a thresholding block to denoise the forward transform in order to reduce the white noise present and improve the rate-distortion.

8. Claims 6, 7, and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nosratinia as modified by Hallapuro and Winger as applied to claims 1-3 above, and further in view of Malvar (IEEE Transactions on circuits and systems for video technology vol 12, 598-603, July 2003, "Low Complexity Transform and Quantization in H.264/AVC"). The teachings of Nosratinia as modified by Hallapuro and Winger have been discussed above.

Re Claim 6, 7, 9-11: However, Nosratinia as modified by Hallapuro and Winger fails to disclose or fairly suggest F is an arithmetic operator, F is a rounding arithmetic operator, F is a mapping from weighted coefficients of D to corresponding coefficients of Z, the coefficient of D are weighted by a

common scaling factor, F corresponds to a rounding operator applied to the weighted coefficients of D.

Malvar discloses the F may be an arithmetic operator / scalar to the DCT (page 599, col 2, paragraph 3-5, equation 3), F may be a rounding arithmetic operator / rounding scalar to the DCT (page 599, col 2, paragraph 3-5, equation 3), F is a mapping from weighted coefficients / scaling of D to corresponding coefficients of Z (page 599, col 2, paragraph 3-5, equation 3), the coefficient of D is weighted by a common scaling factor (page 599, col 2, paragraph 3-5, equation 3), F corresponds to a rounding operator applied to the weighted coefficients of D(page 599, col 2, paragraph 3-5, equation 3).

Therefore, in view of Malvar, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Nosratinia's method, as modified by Hallapuro and Winger by including a procedure of scaling the DCT as the operator F to derive the denoiser transform Z, and by including a procedure of rounding the scaled DCT as the operator F to derive the denoiser transform Z, and by including a procedure of mapping the weighted coefficients of D through the use of a scaling factor, and by including a procedure of mapping the weighted coefficients of D through the use of a common scaling factor, and by including a procedure of mapping the weighted coefficients of D through the use of a common scaling factor and then through the use of a

rounding operator, in order to allow the advantage of rational numbers in providing the opportunity for the forward and inverse transforms to be computed interchangeably.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nosratinia as modified by Hallapuro and Winger as applied to claim 1 above, and further in view of Merhav et al (US 6,473,534 B1). The teachings of Nosratinia as modified by Hallapuro and Winger have been discussed above.

However, Nosratinia as modified by Hallapuro and Winger fails to disclose or fairly suggest the forward transforms are computed based on a factorization of Z.

Merhav discloses the forward transforms are computed based on a factorization of Z (col. 3-4, lines 32-37, lines 41-65).

Therefore, in view of Merhav, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Nosratinia's method, as modified by Hallapuro and Winger by including a procedure of factorizing Z in order to increase the speed with acceptably minimal degradation of the final output.

10. Claims 1-2, 4, 16, 17, and 20-30 are rejected under 35 U.S.C. 103(a) as being obvious over Samadani et al (US 2005/0078872).

The applied reference has a common assignee and has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2). The reason for obviousness is described below.

Samadani '872 discloses:

> Re Claims 1, and 28-30: Samadani '872 discloses for claim 1 of the present invention a method of processing an input image, comprising computing spatially-shifted forward transforms (see page 4, claim 1) of the input image, each forward transform being computed based on a denoiser

transform Z having an associated transpose Z', wherein a matrix multiplication between Z and Z' produces a diagonal matrix Λ, Z = F(D), F specifies a mapping from coefficients of D to coefficients of Z (Note that if the mapping function F was a linear mapping, it is possible that F is just equal to D), and D substantially corresponds to a frequency-domain transform / DCT (see page 5, claim 3); denoising the forward transforms based on nonlinear mappings (see page 4, claim 1) derived from quantization values linked to the input image; computing spatially-shifted inverse transforms (see page 4, claim 1) of the denoised forward transforms, each inverse transform being computed based on Z and Z'; and computing an output image (see page 4, claim 1) based on a combination of spatially-shifted inverse transforms.

This is similarly applied to claim 28 where instead of a method comprising of several steps, a system comprising of several modules to produce those same steps respectively is considered. Samadani '872 teaches all the limitations in the same respective manor as described above for claim 1 except instead of referring to claim 1 in page 4 of Samadani '872 for support, the support is found in claim 23 in page 5 of Samadani '872.

This is similarly applied to claim 29 where instead of a method comprising of several steps, a system comprising of several means to produce those same steps respectively is considered. Samadani '872 teaches all the limitations in the same respective manor as described

above for claim 1 except instead of referring to claim 1 in page 4 of Samadani '872 for support, the support is found in claim 45 in page 6 of Samadani '872.

This is similarly applied to claim 30 as understood where instead of a method comprising of several steps, a computer-readable medium storing a computer program for causing a computer to compute those several same steps respectively is considered. Samadani '872 teaches all the limitations in the same respective manor as described above for claim 1 except instead of referring to claim 1 in page 4 of Samadani '872 for support, the support is found in claim 46 in page 6 of Samadani '872.

Re Claim 2: Samadani '872 discloses D is a block-based linear transform (see page 5, claim 2).

Re Claim 4: Samadani '872 discloses D is a discrete cosine transform (see page 5, claim 3).

Re Claim 16: Samadani '872 discloses the forward transforms are denoised by setting to zero each forward transform coefficient with an absolute value below a respective threshold derived from a respective quantization value linked to the input image and leaving unchanged each forward transform coefficient with an absolute equal to at least a

respective threshold derived from a respective quantization value linked to the input image (see page 5, claim 4).

Re Claim 17: Samadani '872 discloses sharpening the forward transform coefficients by increasing nonlinear transform parameter by respective factors that are larger for higher spatial frequency forward transform coefficients than for lower spatial frequency forward transform coefficients (see page 5, claim 5).

Re Claim 20: Samadani '872 discloses computing the output image comprises computing a base image from a combination of inverse transforms (see page 5, claim 6).

Re Claim 21: Samadani '872 discloses the base image has pixel values corresponding to respective averages of values of corresponding pixels in the inverse transforms (see page 5, claim 7).

Re Claim 22: Samadani '872 discloses computing the output image further comprises computing a ringing correction image based at least in part on computed measures of local spatial intensity variability for pixels of each of the inverse transforms (see page 5, claim 8 and 9).

Re Claim 23: Samadani '872 discloses assigning to each pixel in the ringing correction image a value of a corresponding intermediate image pixel having a lowest computed measure of local spatial intensity variability of the corresponding intermediate image pixels (see page 5, claim 10).

Re Claim 24: Samadani '872 discloses assigning to each pixel in the ringing correction image a value corresponding to an average of multiple corresponding intermediate image pixels in a lowest percentile of local spatial variability measures of the corresponding intermediate image pixels (see page 5, claim 11).

Re Claim 25: Samadani '872 discloses the output image is computed by combining pixel values from the base image and the ringing correction image (see page 5, claim 12).

Re Claim 26: Samadani '872 discloses the output image is computed by a weighted combination of the base image and the ringing correction image (see page 5, claim 13).

Re Claim 27: Samadani '872 discloses the base image contribution to the output image is less than the ringing correction image contribution for

pixels adjacent to transition regions in the base image (see page 5, claim 22).

However, Samadani '872 does not disclose or fairly suggest exactly how each of the forward transforms are being computed based on a denoiser transform Z.

Hallapuro discloses how each of the forward transforms / desired transform matrix (see col. 8, lines 51-53) are being computed based on a denoiser transform Z / A (see col. 8, lines 51-53). The applicant describes the forward transform B is ZXZ' and Hallapuro describes the desired transform matrix Y is AXA'. Note that the inverse transform would obviously be computed by inversing the above procedure, which is equivalent to what has been described by the applicant.

Therefore, in view of Hallapuro, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Samadani's '872 method by including the computation of deriving the forward transforms by a denoiser transform Z in order to require less operations when the transform is applied to digital data.

Obviousness-Type Double Patenting Rejection

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1-2, 4,16,17, and 20-30 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13, 22-23, and 45-46 of copending Application No. 10/683,322 in view of Hallapuro (US 7,082,450).

For example, the '322 copending Application discloses in claim 1 a method of processing an input image, comprising computing spatially-shifted forward transforms of the input image to generate respective sets of forward transform coefficient; applying nonlinear transforms to the forward transform coefficients of each set; computing inverse transforms of the sets of nonlinearly

transformed forward transform coefficients to generate respective intermediate images; computing respective measures of local spatial intensity variability for pixels of each of the intermediate images; and computing an output image with pixel values computed based at least in part on the computed measures of local spatial intensity variability.

However, the '322 copending Application fails to disclose or fairly suggest the forward and inverse transforms are computed based on a denoiser transform Z, where Z=F(D), where F specifies a mapping from coefficients of D to coefficients of Z, and D substantially corresponds to a frequency-domain transform; the computation to derive the forward and inverse transform basically involves B=ZXA'. Hallapuro discloses how each of the forward transforms / desired transform matrix (col. 8, lines 51-53) are being computed based on a denoiser transform Z / A (col. 8, lines 51-53). The applicant describes the forward transform B is ZXZ' and Hallapuro describes the desired transform matrix Y is AXA'. Note that the inverse transform would obviously be computed by inversing the above procedure, which is equivalent to what has been described by the applicant.

Therefore, in view of Hallapuro, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '322 copending Application method by including the computation of deriving the forward transforms by a denoiser transform Z in order to require less operations when the transform is applied to digital data.

This is similarly applied to independent claims 23, 45, and 46 of '322 copending Application. The claims 2 -13, and 22 of '322 copending Application are basically the same and not patentably distinct from each of the other presently claimed invention encompassed in claims 2, 4,16,17, and 20-27.

Allowable Subject Matter

13. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ozaki discloses a discrete cosine transform method; Song et al discloses a method and apparatus for video noise reduction; Estevez et al discloses a method of coding artifacts reduction; Matthews discloses a method of predicting ringing artifacts in digital images; Berkner et al discloses a method of enhancement of compressed images.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 7:30am-5:00pm and every other Friday 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong-Suk (James) Lee can be reached on (571) 272-7044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Bernard Krasnic
September 20, 2006

JONG SUK LEE
SUPERVISORY PATENT EXAMINER